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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/063,822	05/16/2002	Shu-Wen Sung	KYCP0005USA	4336

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NAIPO (NORTH AMERICA INTERNATIONAL PATENT OFFICE)
P.O. BOX 506
MERRIFIELD, VA 22116

EXAMINER

NGUYEN, JOSEPH H

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 05/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/063,822

Applicant(s)

SUNG ET AL.

Examiner

Joseph Nguyen

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 February 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 May 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 3, 4, 8, 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Sugawara et al.

Regarding claim 1, Sugawara et al discloses on figure 3A a light emitting diode comprising an insulating substrate 301; a semiconductor stack position over the insulating substrate, the semiconductor stack comprising a first surface and a second surface, a distance between the first surface and the insulating substrate is greater than a distance between the second surface and the insulating substrate; a reverse tunneling layer 305 over the first surface; a first transparent ohmic contact electrode 306 positioned directly on the reverse tunneling layer; and a second transparent ohmic contact electrode 307 positioned over the second surface.

Regarding claim 3, Sugawara et al discloses on figure 3A the first transparent ohmic contact electrode 306 comprises at least one selected from a group comprising ITO.

Regarding claim 4, Sugawara et al discloses on figure 3A a light emitting diode comprising a substrate 301; a semiconductor stack positioned over the substrate; a

reverse tunneling layer 305 over the semiconductor stack; and an ohmic contact electrode 306 formed directly on the reverse tunneling layer.

Regarding claim 8, Sugawara et al discloses on figure 3A the ohmic contact electrode 306 is a transparent ohmic contact electrode.

Regarding claim 9, Sugawara et al discloses on figure 3A the transparent ohmic contact electrode 306 is a non-metal transparent ohmic contact electrode.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sugawara et al as applied to claim 1 above, and further in view of Nitta.

Regarding claim 2, Sugawara et al discloses on figure 3A substantially all the structures set forth in the claimed invention except the first transparent ohmic contact electrode and the second transparent ohmic contact electrode comprising the same material. However, Nitta discloses on figure 3 the first transparent ohmic contact electrode 107 and the second transparent ohmic contact electrode 108 comprising the same material. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sugawara et al by having the first transparent ohmic contact electrode and the second transparent ohmic contact

electrode comprising the same material for the purpose of improving the performance of an LED device.

Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Koide et al in view of Watanabe et al.

Regarding claim 5, Koide et al discloses on figure 11 a light emitting diode comprising an insulating substrate 1, a buffer layer 2 positioned on the insulating substrate; an n+ type contact layer 3 positioned on the buffer layer, the contact layer comprising a first surface and a second surface; an n type cladding layer 4 positioned on the first surface of the n+ type contact layer; a light emitting layer 50 positioned on the n-type cladding layer; a p type cladding layer 61 positioned on the light emitting layer; a p-type contact layer 62 positioned on the p type cladding layer;...p type transparent ohmic contact electrode 7...; an n type transparent ohmic contact electrode 8 positioned on the second surface of the n+ type contact layer; wherein the p type transparent ohmic contact electrode 7 and the n type transparent ohmic contact electrode 8 comprise the same materials. Koide et al does not disclose an n+ type reverse tunneling layer positioned on the p-type contact layer. However, Watanabe et al discloses on figure 1 an n+ type reverse tunneling layer 7 positioned on the p type contact layer 6. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Koide et al by having an n+ type reverse tunneling layer positioned on the p-type contact layer for the purpose of obtaining a high efficiency Led device as taught by Watanabe et al (col. 3, lines 1-3).

Regarding claim.6, Koide et al discloses the insulating substrate is sapphire.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Koide et al and Watanabe et al as applied to claim 5 above, and further in view of Nitta.

Regarding claim 7, Koide et al and Watanabe et al disclose the first and second transparent ohmic contact electrodes made of the same material. Koide et al and Watanabe et al do not disclose the same material being ITO. However, Nitta discloses on figure 3 that the electrode 107 made of ITO. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Koide et al and Watanabe et al by having the first and second transparent ohmic contact electrodes made of ITO for the purpose of improving the performance of an LED device.

Response to Arguments

Applicant's arguments filed on 2/27/2003 have been fully considered but they are not persuasive.

With respect to claim 5, applicant argues that Watanabe et al does not disclose a reverse tunneling layer that has to be conductive in the bias direction of the LED stack. However, Watanabe et al clearly discloses on figure 1 the reverse tunneling layer 7 that is conductive. Note that layer 7 is made of a doped InAlP, which is a semiconductor and thus is conductive. Therefore, the combination of Koide and Watanabe et al reads on claim 5 therein.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Nguyen whose telephone number is (703) 308-1269. The examiner can normally be reached on Monday-Friday, 7:30 am- 4:30 pm

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on (703) 308-1690. The fax phone numbers for the organization where this application or proceeding is assigned is (703) 308-7382 for regular communications.

Art Unit: 2815

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JN
April 30, 2003

A handwritten signature in black ink, appearing to read 'Eddie Lee', with a large, sweeping initial 'E'.

EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800